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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,722	07/15/2003	David B. Chung	42390.P12047C	9057

7590 12/03/2003
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EXAMINER

CHIUNG, DAVID Y

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/620,722	CHUNG ET AL.	
	Examiner	Art Unit	
	David Y. Chung	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-15 is/are rejected.
- 7) ☒ Claim(s) 9 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1 and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Masami et al. (U.S. 6,040,888) in further view of Moore (U.S. 6,124,912).

As to claims 1, 10 and 11, Masami et al. discloses a liquid crystal projection display comprising three liquid crystal light valves for displaying red, green, and blue images, each valve having a plurality of pillar shape spacers, wherein the spacers are distributed such that they do not overlap with each other when their composite image is projected onto the screen. Note the spacer distribution for each of the liquid crystal light valves in figures 2, 3, and 4. Note also the spacer distribution of the composite image in figure 5. Note in figure 1, the silicon substrate 100, glass substrate 116, and aluminum pixel elements 112. See column 3, line 66 – column 4, line 28. See also column 5, lines 44-51.

Masami et al. does not disclose an anti-reflective layer formed over the aluminum pixel elements. Moore teaches applying layers of dielectric material to the reflective

surface of the liquid crystal device in order to increase the reflectivity of the surface and thereby improve the contrast ratio and brightness. See abstract and column 2, lines 34-48. Note in figure 2, the anti-reflective layers 230-233 formed over the reflective electrode 227. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form an anti-reflective layer over the pixel elements in order to improve contrast ratio and brightness.

As to claims 2 and 12, although Masami et al. discloses that the pillar shaped spacers are formed of silicon oxide, it was well known and obvious that forming the spacers using other inorganic material such as silicon nitride was a functionally equivalent alternative. Evidence of this is found in the disclosure of Crawford et al. in column 3, lines 48-50. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the spacers of Masami et al. of silicon nitride instead of silicon dioxide because it was a functionally equivalent alternative.

As to claims 3 and 13, figures 2-4 of Masami et al. clearly show the pillar shape spacers on corner portions of four adjacent pixels.

As to claims 4 and 5, Moore teaches forming a first anti-reflective layer of silicon dioxide and a second anti-reflective layer of silicon nitride over the reflective pixel element so that the reflected light constructively interferes, bringing the reflection closer to 100%. See column 5, lines 5-18. Therefore, it would have been obvious to one of

ordinary skill in the art at the time of invention to form a silicon dioxide and silicon nitride layer over the pixel element in order to bring the reflection closer to 100%.

As to claims 6 and 14, figure 1 of Masami et al. clearly conveys that the spacers 118 have a width substantially smaller than the width of the pixel elements 112.

As to claims 7 and 15, Masami et al. discloses that each liquid crystal light valve is of reflection type for reflecting light of a different color. See abstract.

As to claim 8, Masami et al. discloses that the three liquid crystal light valves reflect red, green and blue respectively. See abstract.


Allowable Subject Matter

2. Claims 9 and 16 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of Masami et al. taught away from forming some of the spacers on a single pixel element.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Chung whose telephone number is (703) 306-0155. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.

A handwritten signature in black ink, appearing to read 'KENNETH PARKER', with a long horizontal stroke extending to the right.

**KENNETH PARKER
PRIMARY EXAMINER**